

# Lichen 101:

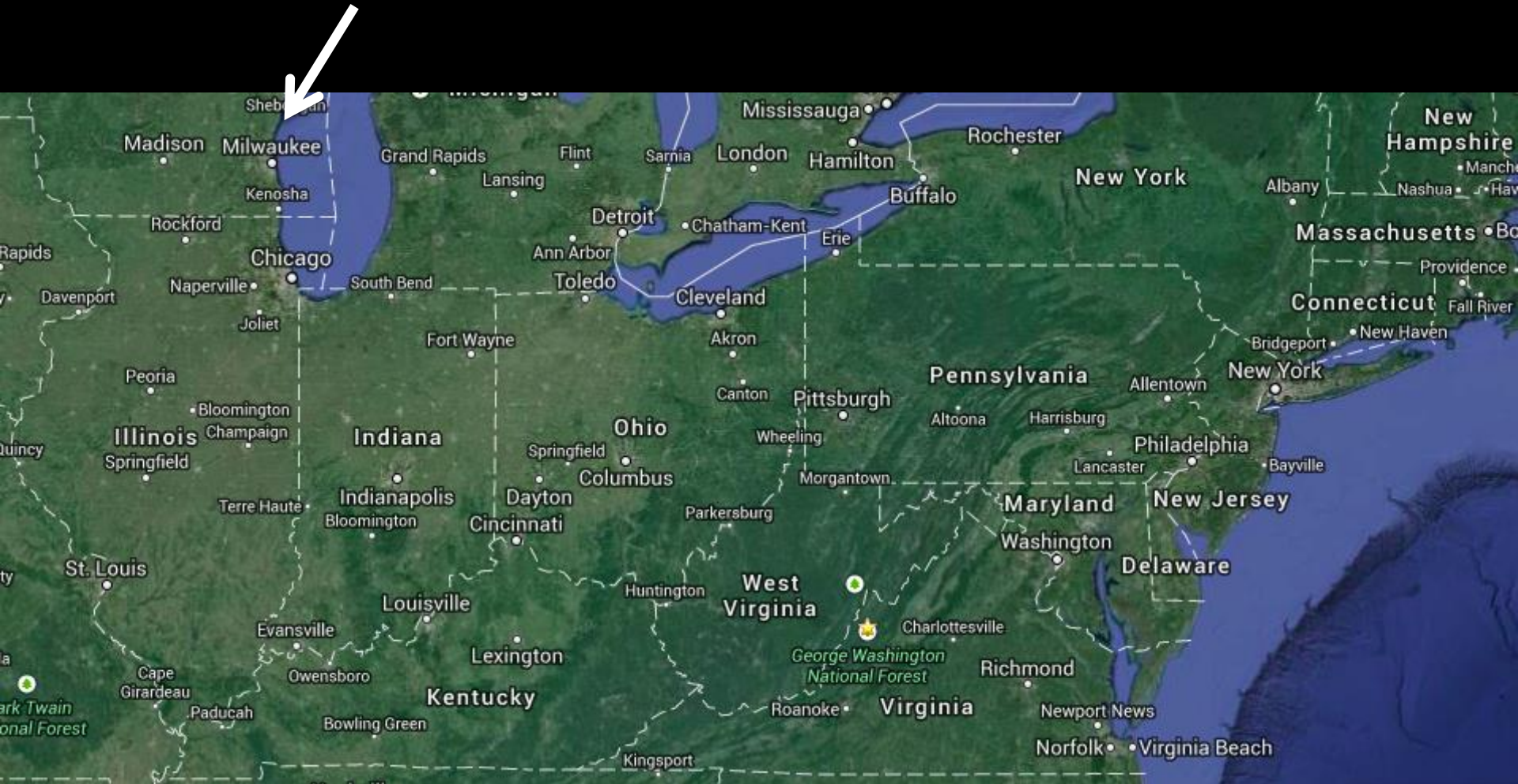
## What An Arborist Needs To Know About Lichen

Joe Murray

Consulting Arborist/Educator

Williamsville, Virginia

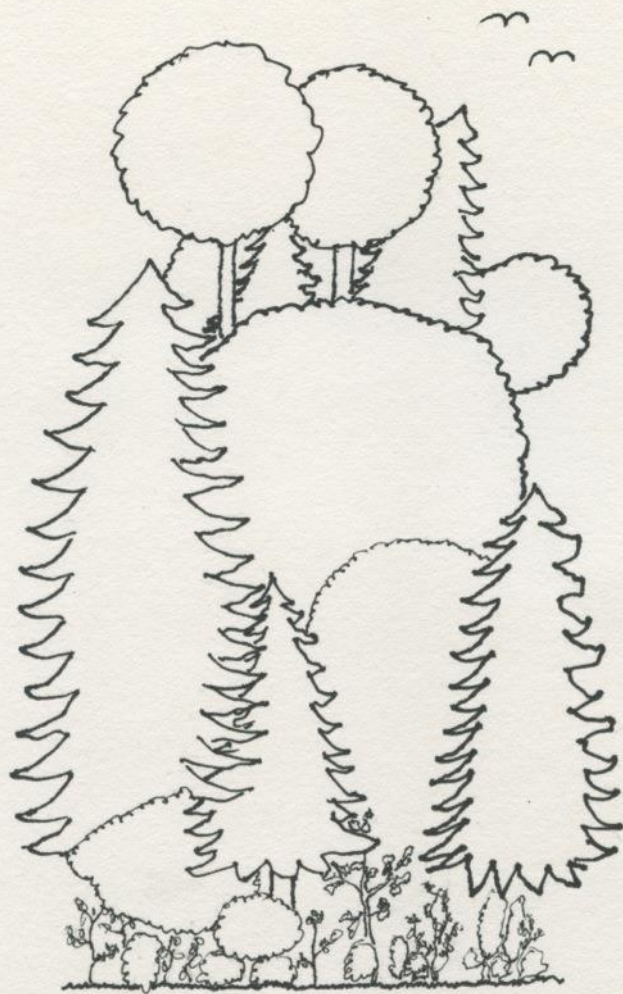
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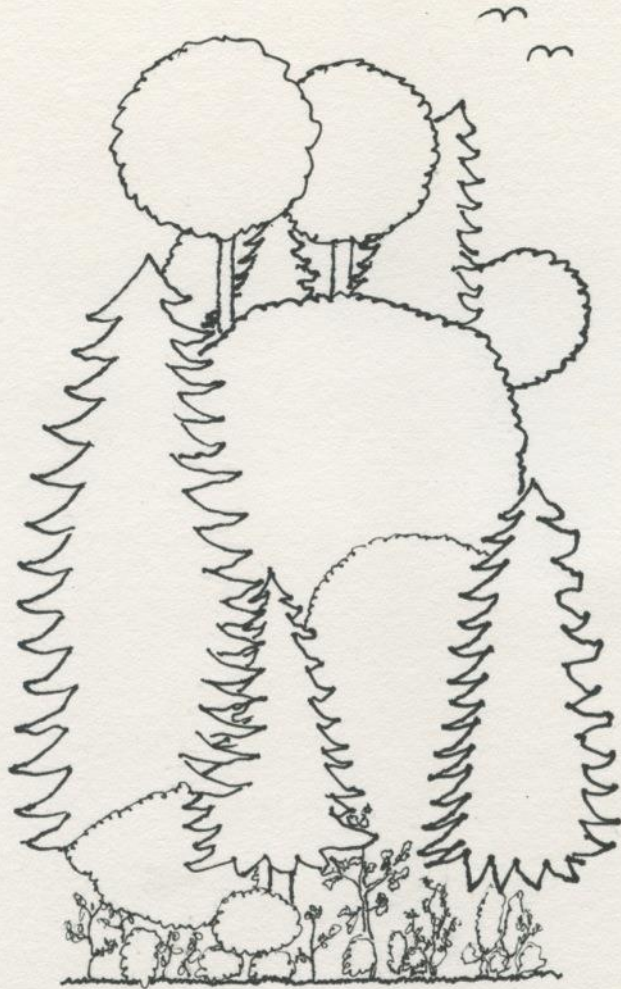




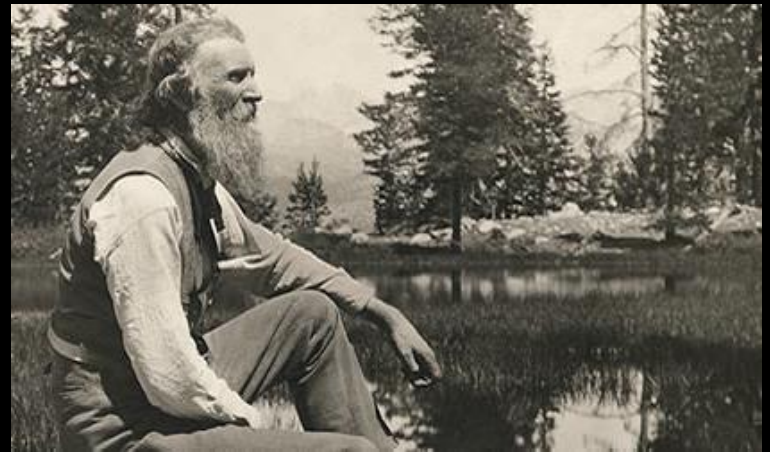


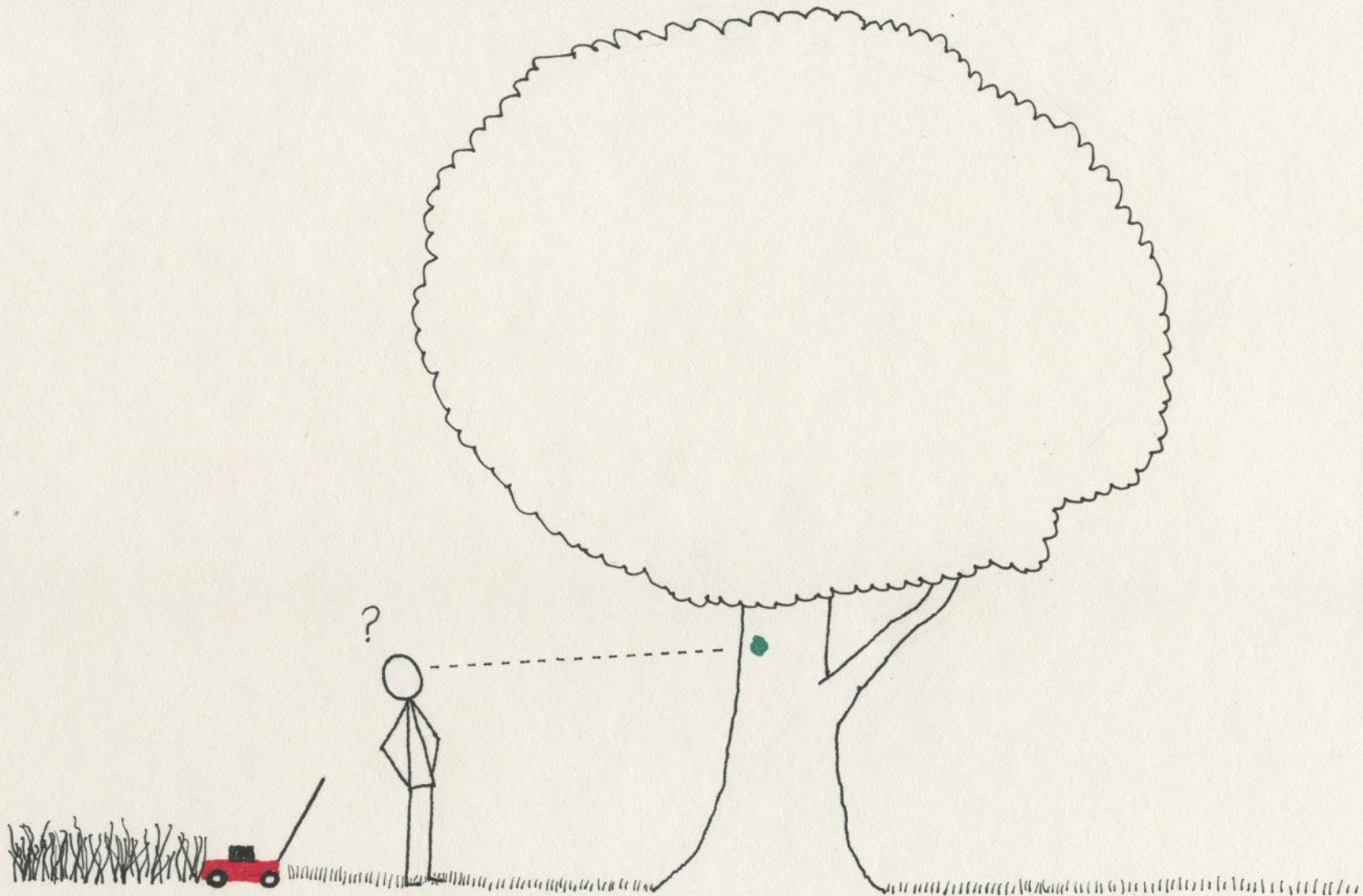






**"When we try to pick out anything by itself, we find it hitched to everything else in the Universe."**









## Next-gene

### Hodkinson

<sup>1</sup>Pereleman Schön  
<sup>2</sup>Institute of Syn

Hodkinson BI  
phylogeny. M

### Abstract

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organisms tha  
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Pl. Syst. Evol. 181: 255–260 (1992)

### Plant Systematics and Evolution

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### Plant Systematics and Evolution

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## A new combination and a new species in the lichen genus *Catapyrenium* (lichenized *Ascomycetes*, *Verrucariaceae*)

OTHMAR BREUSS and JAVIER ETAYO

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### Plant Systematics and Evolution

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## A phylogenetic analysis of the lichen family *Sphaerophoraceae* (*Caliciales*); a new generic classification and notes on character evolution

MATS WEDIN

Received February 1, 1993; in revised version March 25, 1993

**Key words:** *Ascomycetes*, *Bunodophoron*, *Caliciales*, *Calycidium*, *Leifidium*, *Sphaerophoraceae*, *Sphaerophorus*. — Cladistics, classification, evolution, systematics, phylogeny.

**Abstract:** A phylogenetic analysis of the family *Sphaerophoraceae* (*Caliciales*, lichenized ascomycetes) has resulted in a new generic classification. Notes on character evolution are given. The genera *Sphaerophorus* s. str., *Bunodophoron* and *Leifidium*, gen. nov., are accepted. *Pleurocybe* and *Pseudosphaerophorus* are considered synonyms of *Bunodophoron* and *Thysanophoron* is considered synonym of *Sphaerophorus*. The following new combinations are proposed: *Bunodophoron coomerense* (OHLSSON) WEDIN, *B. diplotypum* (VAIN.)

, *Catapyrenium*, *Cata-*  
*p. nova*. — Systematics,  
land.

ern Spain and adjacent  
The new species differs  
onomy, ecology, and

*natocarpon* and then  
ortant group of pyr-  
d regions. The genus  
quamae are fastened  
referably on soil and  
simple and relatively  
of great taxonomic  
uropean members of  
further three species  
ocean *Catapyrenium*

ain, one of us (J. E.)  
*tocarpon velebiticum*.  
genus *Catapyrenium*.  
ype specimen of that  
*urpon velebiticum* had  
as it was believed to  
*stelia*). In *Dermato-*  
entral umbilicus, and  
distinct vertical rows,  
arran collections the  
ntrically interwoven  
ills. For these reasons

## Do they occur free-living?\*

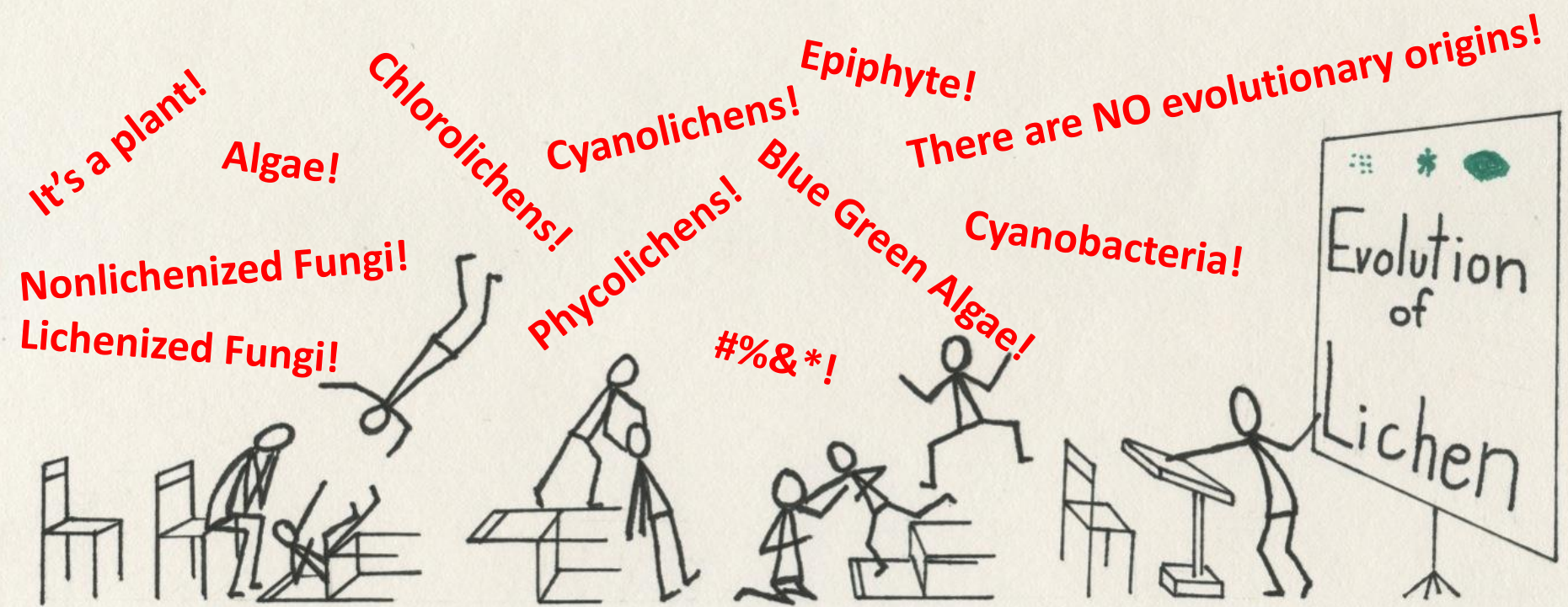
terrestre. — Evolution of lichen sym-

non photobiont of lichens, *Trebouxia*,  
. The few *Trebouxia* cells that have  
eleased from asexual propagules or  
d form of *Pleurastrum* and does not

fungi and algae that form lichens  
that is, are they facultative sym-  
bionts? The diversity of sym-  
bionts might explain the diversity  
of lichens. The synthesis takes place in nature.  
discharged from the ascocarps of  
the germination of the spores.  
finding of free-living, i.e. without  
any belief, first stated twenty years  
ago, is that the symbionts of  
lichens are obligate and  
(HMADJIAN 1987). Such a view is  
confirmed by his paper that new evidence based  
on Ewart (1984) supports this view.

### Notes on *Trebouxia*

There may be natural populations of  
free-living *Trebouxia* cells that  
were reported findings of *Tre-*  
*bouxia* hyphae" from more than  
trees. BUBRICK & al. (1984) also  
found *Trebouxia*, one of which was identical  
to that which their findings together  
indicated that *Trebouxia* is a member of



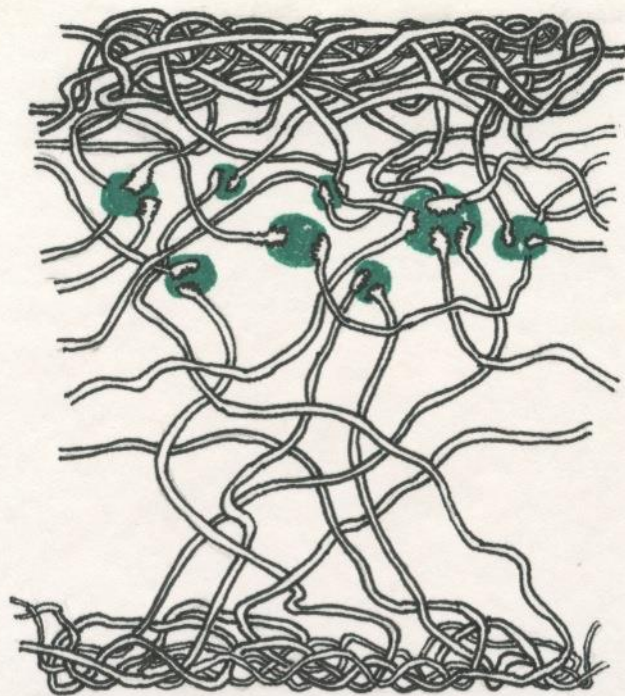




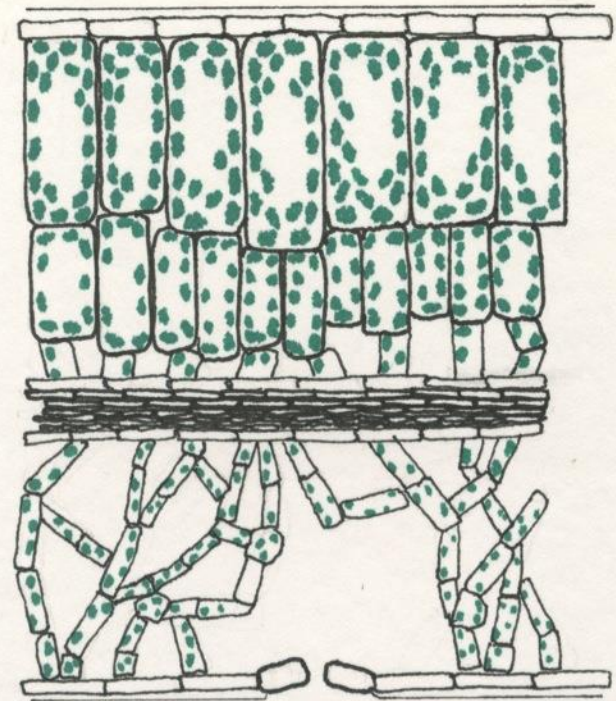
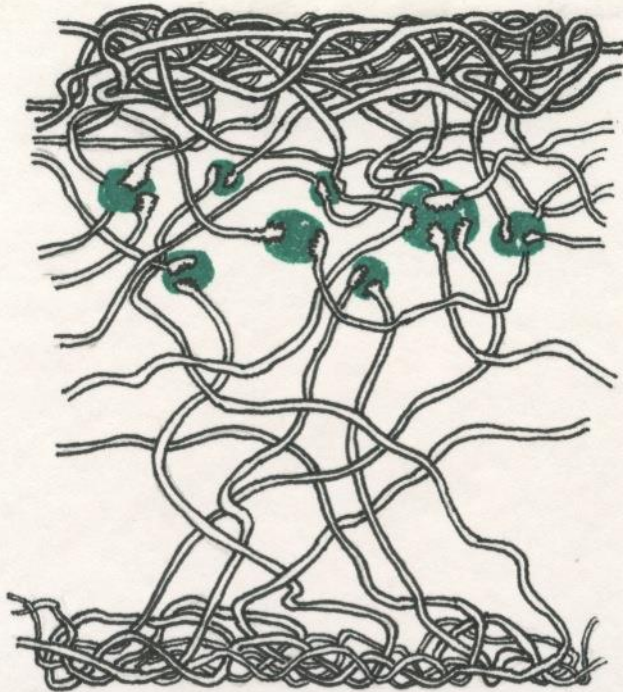
Lynchburg, Virginia



South Shields, England



















Crustose

Foliose

Fruticose







Burnsville, Virginia









**Tree Lungwort**  
**(Lobaria pulmonaria)**

Burnsville, Virginia



# Sugar Maple (*Acer saccharum*)







# Tulip Poplar (*Liriodendron tulipifera*)



# White Oak (*Quercus alba*)





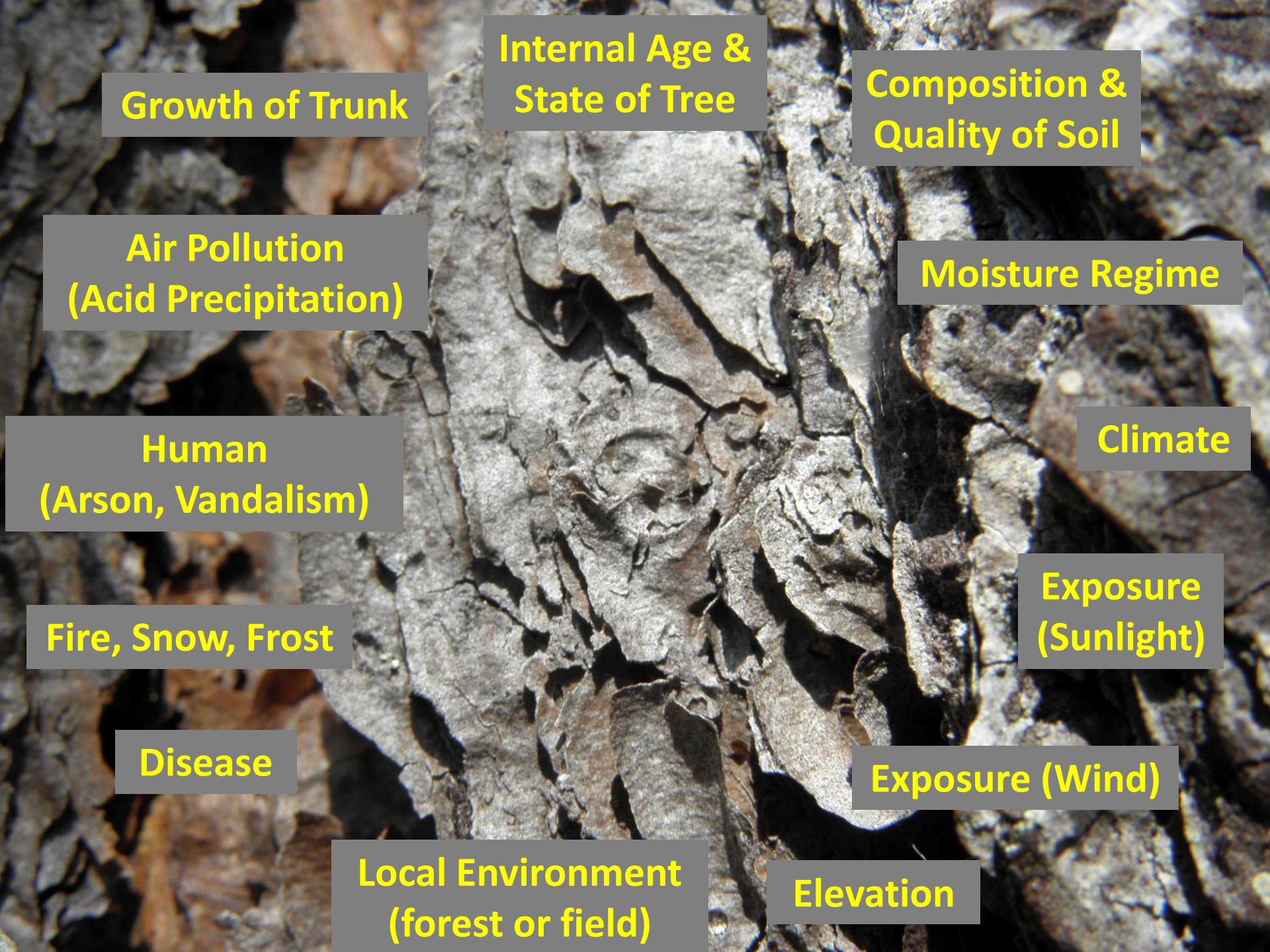
# Pitch Pine (*Pinus rigida*)











**Growth of Trunk**

**Internal Age &  
State of Tree**

**Composition &  
Quality of Soil**

**Air Pollution  
(Acid Precipitation)**

**Moisture Regime**

**Human  
(Arson, Vandalism)**

**Climate**

**Fire, Snow, Frost**

**Exposure  
(Sunlight)**

**Disease**

**Exposure (Wind)**

**Local Environment  
(forest or field)**

**Elevation**



**Influence from  
Animals & Microflora**

```
graph TD; A["Influence from Animals & Microflora"] --> B["Moss"]; A --> C["Fungi"]; A --> D["Algae"]; A --> E["Lichens"];
```

The diagram is overlaid on a close-up photograph of rough, greyish-brown tree bark. A central grey box with a red border at the top contains the text "Influence from Animals & Microflora". Four red lines radiate from the bottom of this box to four smaller grey boxes with red borders below it. These boxes are labeled "Moss", "Fungi", "Algae", and "Lichens" in yellow text. The "Moss" box is on the left, "Fungi" is in the lower-left, "Algae" is in the lower-right, and "Lichens" is on the right.

**Moss**

**Fungi**

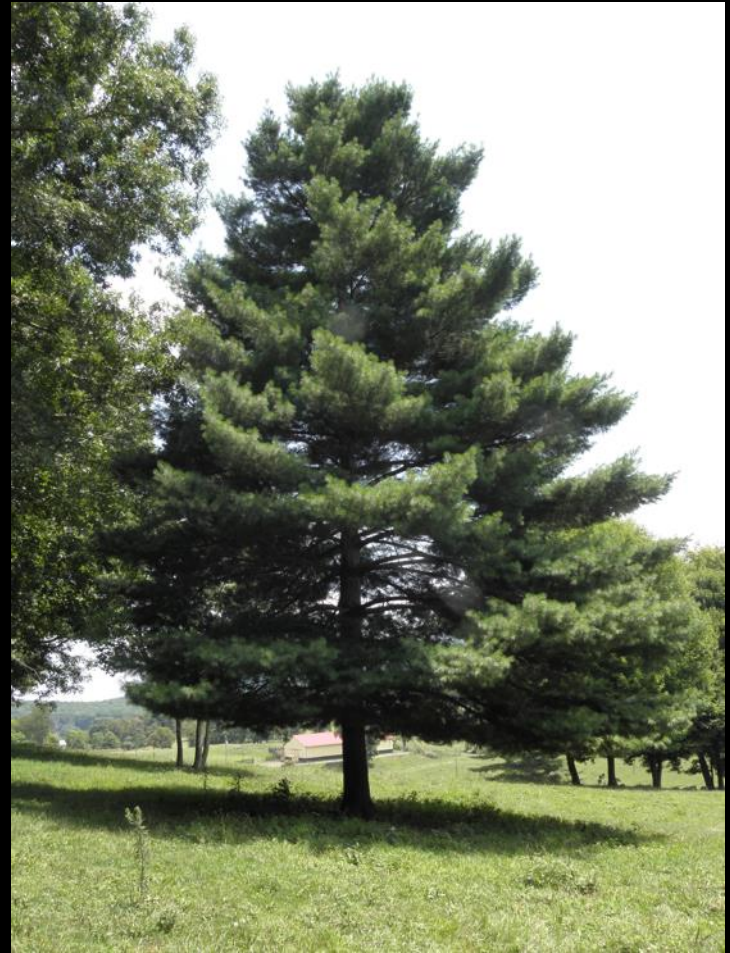
**Algae**

**Lichens**





# Tree Architecture (Crown Shape)





# Tree Architecture (Branch Orientation)



Pitch Pine (*Pinus rigida*)



Norway Spruce (*Picea abies*)

# Tree Architecture (Branch Orientation)



Pitch Pine (*Pinus rigida*)



Norway Spruce (*Picea abies*)



# Stemflow

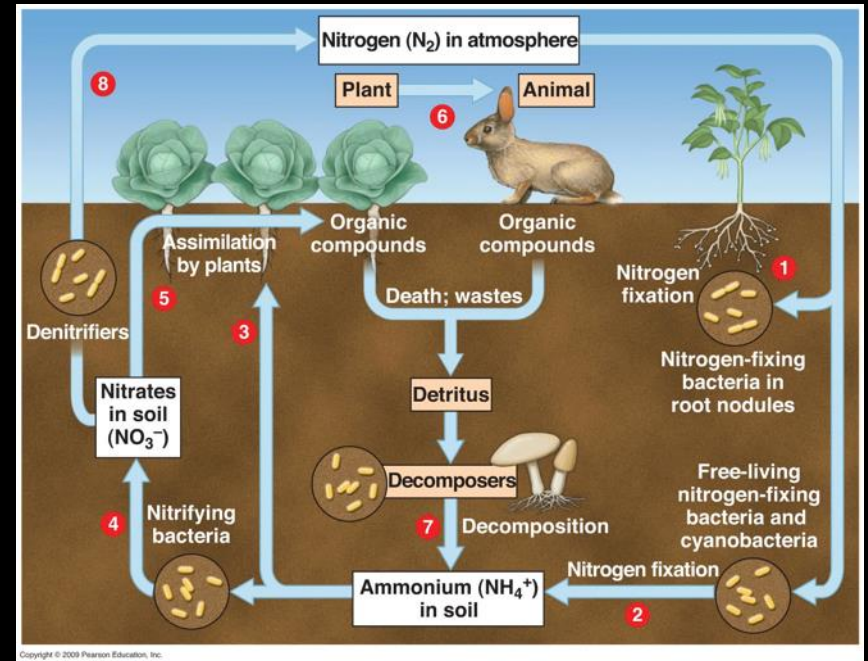
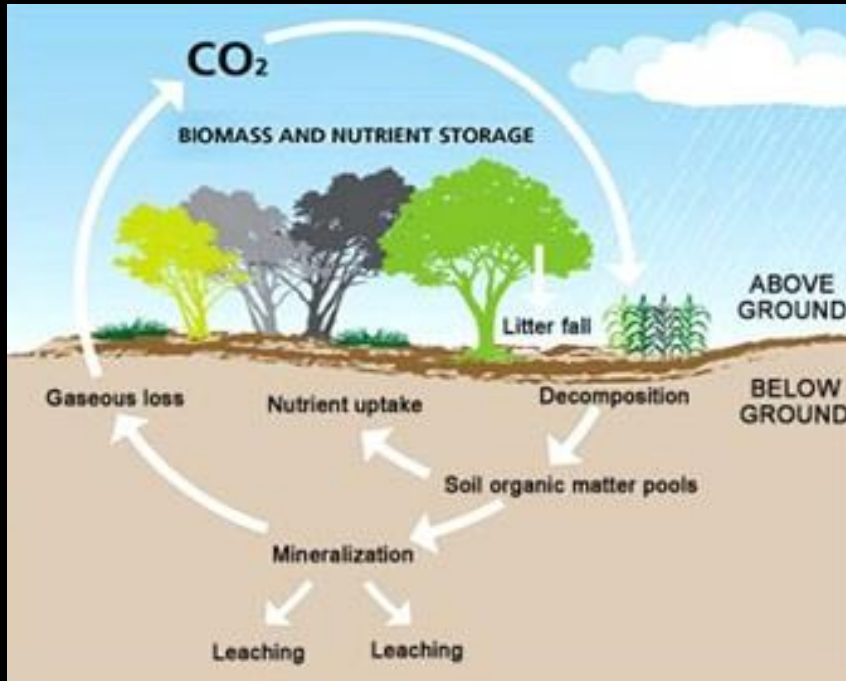
















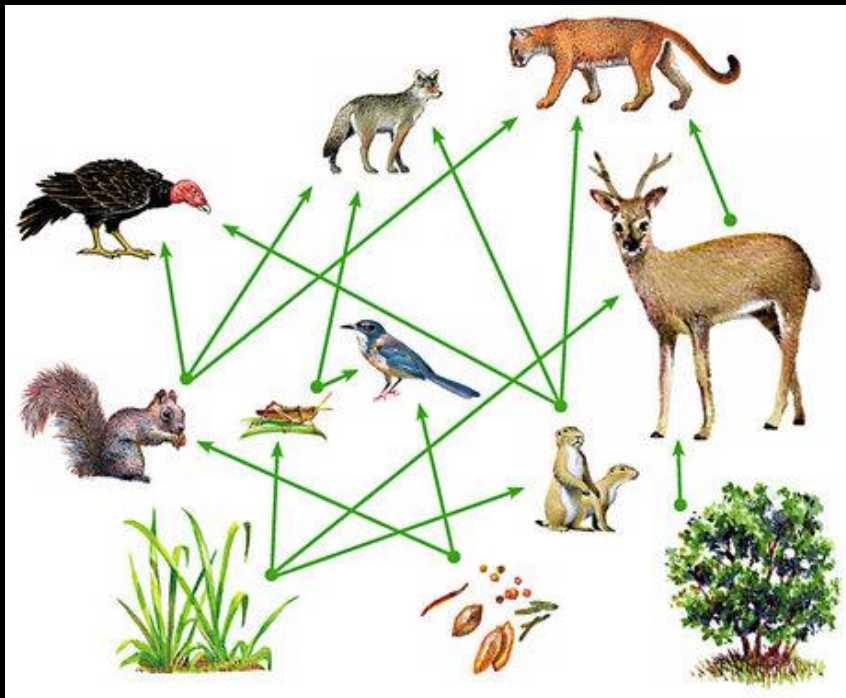
Knockan Crag, Scotland





Shenandoah Mountain, Virginia





# Biological Methods of Prospecting for Minerals

Brooks, R.R.

Note: This is not the actual book cover.

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Fertilization  
Installation  
Staking

Lightning Protection  
Air Excavation

Diagnosis & Pest Management  
Plant Health Care  
Removing Invasive Species

Tree Risk Assessment

Irrigation  
Selection  
Mulching  
Cabling



Pruning  
Fertilization  
~~Installation~~

Irrigation  
Selection  
Mulching  
~~Cabling~~

~~Staking~~

Lightning Protection

~~Air Excavation~~

Diagnosis & Pest Management

Plant Health Care

Removing Invasive Species

Tree Risk Assessment



# Pruning



Amherst, Virginia



Burnsville, Virginia

# Fertilization & Irrigation





# Selection & Mulching



# Lightning Protection & Pest Management





# Managing Invasive Species & Tree Risk Assessment



# Lichen Transplants?





... \_\_\_\_\_ *are the essence of wildness.*

Irwin Brodo



**Lichens** *are the essence of wildness.*

Irwin Brodo



Glen Affric, Scotland



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